INTER-CELL INTERFERENCE DETECTION FOR INTER PORTABLE LONG TERM EVOLUTION LOCAL AREA NETWORK INTERFERENCE

BACKGROUND

[0001] 1. Field

[0002] The long term evolution (LTE) of the third generation partnership project may benefit from a long term evolution local area network (LTE-LAN) system, such as a portable LTE-LAN system. Moreover, an LTE-LAN system may benefit from inter-cell interference (ICI) detection for inter portable LTE-LAN interference.

[0003] 2. Description of the Related Art

[0004] In general, a long term evolution local area network (LTE-LAN) can provide local area (LA) coverage for indoor, home, residential, and enterprise usage with, for example, fixed deployment. FIG. **1** illustrates the architecture of an example of a fixed LTE-LAN.

[0005] As shown in FIG. **1**, the LTE-LAN access point (AP) can provide LTE-based wireless connections to local area devices and can be connected to the core network (CN) via an S1 interface. The mobile terminals can establish radio connections the LTE-LAN AP or with a macro eNode B (eNB). This architecture can be similar to a conventional LTE femto architecture, and can be suitable for fixed deployment in residential and enterprise scenarios.

[0006] In addition to fixed deployment with the architecture illustrated in FIG. **1**, another type of LTE-LAN architecture can also be provided, such as a portable LTE-LAN architecture. FIG. **2** illustrates an example of a portable LTE-LAN architecture. As shown in FIG. **2**, the portable LTE-LAN AP can have double functionality: for LTE-LAN, it can serve as an access point; for the cellular network, it can serve as a regular UE or wireless modem. This kind of LTE-LAN AP can be embedded into a portable or mobile device and can access the core network (CN) through cellular link as a normal UE.

SUMMARY

[0007] According to certain embodiments, a method includes measuring, with a first local access point, a first power of a first uplink sequence and a second power of a second uplink sequence from at least one user equipment. The method also includes determining that the first local access point and a second local access point are interfering with one another based on a comparison of the first power and the second power.

[0008] In certain embodiments, a method includes preparing an uplink sequence for transmission from a user equipment to an access point. The method also includes including in the uplink sequence, a common first part and a random second part. The method further includes initiating transmission of the uplink sequence to the access point.

[0009] A non-transitory computer-readable medium is, according to certain embodiments, encoded with instructions that, when performed in hardware, perform a process. The process includes measuring, with a first local access point, a first power of a first uplink sequence and a second power of a second uplink sequence from at least one user equipment. The process also includes determining that the first local access point and a second local access point are interfering with one another based on a comparison of the first power and the second power.

[0010] A non-transitory computer-readable medium is, in certain embodiments, encoded with instructions that, when performed in hardware, perform a process. The process includes preparing an uplink sequence for transmission from a user equipment to an access point. The process also includes including in the uplink sequence, a common first part and a random second part. The process further includes initiating transmission of the uplink sequence to the access point.

[0011] According to certain embodiments, an apparatus includes at least one processor and at least one memory including computer program code. The at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to measure, with a first local access point, a first power of a first uplink sequence and a second power of a second uplink sequence from at least one user equipment. The at least one memory and the computer program code are also configured to, with the at least one processor, cause the apparatus at least to determine that the first local access point and a second local access point are interfering with one another based on a comparison of the first power and the second power.

[0012] An apparatus, in certain embodiments, includes at least one processor and at least one memory including computer program code. The at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to prepare an uplink sequence for transmission from a user equipment to an access point. The at least one memory and the computer program code are also configured to, with the at least one processor, cause the apparatus at least to include in the uplink sequence, a common first part and a random second part. The at least one memory and the computer program code are further configured to, with the at least one processor, cause the apparatus at least to initiate transmission of the uplink sequence to the access point.

[0013] An apparatus according to certain embodiments includes measuring means for measuring, with a first local access point, a first power of a first uplink sequence and a second power of a second uplink sequence from at least one user equipment. The apparatus also includes determining means for determining that the first local access point and a second local access point are interfering with one another based on a comparison of the first power and the second power.

[0014] An apparatus, in certain embodiments, includes preparing means for preparing an uplink sequence for transmission from a user equipment to an access point. The apparatus also includes including means for including in the uplink sequence, a common first part and a random second part. The apparatus further includes initiating means for initiating transmission of the uplink sequence to the access point.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] For proper understanding of the invention, reference should be made to the accompanying drawings, wherein:

[0016] FIG. **1** illustrates the architecture of an example of a fixed LTE-LAN.

[0017] FIG. **2** illustrates an example of a portable LTE-LAN architecture.

[0018] FIG. **3** illustrates LTE-LANs in close proximity according to certain embodiments.